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finer than the transverse ones are brought out. These lines, which I consider genuine, count not far from 120,000 to the inch. With a slight change of the adjustment their place is occupied by spurious lines counting generally about 60,000 to the inch. The longitudinal lines can only be seen when the focus is best adjusted for the transverse striæ. When the transverse lines are examined, they may be shown smooth and shining, similar to the photograph by Dr. Woodward in the *NATURALIST*, but much better. If the mirror is then carefully touched a sinuate appearance of the margins of the lines, suggestive of beading, is seen. This appearance can be brought out readily. And, finally, after the most painstaking manipulation, and when without doubt the best work is being done, the separated dots or beads appear.—G. W. MOREHOUSE.

#### NOTES.

ON the 21st of April Mr. Anderson formally presented the island of Penekese, together with a fund of \$50,000 for the endowment of a School of Natural History. The board of trustees of the school and fund is in part the same as that governing the Museum of Comparative Zoology at Cambridge, of which this school is to be the educational branch. Plans have been drawn for two two-story buildings, each one hundred feet long and twenty-five feet wide. The lower floors are intended for laboratories and working rooms. The second story will contain sleeping rooms, and rooms for the preservation of specimens. The deed makes Professor Agassiz president of the board of trustees and director of the school, with the sole control of the method of instruction, and the appointment of teachers. The school will be called "The Anderson School of Natural History," and will be opened early in July.

FROM want of space we have been unable to adequately notice the remarks made at the banquet lately given in New York to Professor Tyndall just before he sailed for England. Many of the leading scientists of the country, with those eminent in all professions in New York, met him at Delmonico's. Perhaps this is the first occasion of the sort when in this country science has, through her followers and through those engaged in quite different pursuits, received due consideration. The after dinner speeches, with one or two exceptions, were animated with the true spirit of devotion to truth, which is but another term for the scientific spirit.

The burden of Professor Tyndall's admirable and delightful speech was the importance of producing trained original investigators. He had alluded to this before in his sixth and concluding lecture, where he says,—

“When analysed, what are industrial America and industrial England? If you can tolerate freedom of speech on my part, I will answer this question by an illustration. Strip a strong arm, and regard the knotted muscles when the hand is clinched and the arm bent. Is this exhibition of energy the work of the muscles alone? By no means. The muscle is the channel of an influence, without which it would be as powerless as a lump of plastic dough. It is the delicate unseen nerve that unlocks the power of the muscle. And without those filaments of genius which have been shot like nerves through the body of society by the original discoverers, industrial America and industrial England would, I fear, be very much in the condition of that plastic dough. At the present time there is a cry in England for technical education, and it is the expression of a true national want; but there is no outcry for original investigation. Still without this, as surely as the stream dwindles when the spring dries, so surely will their technical education lose all force of growth, all power of reproduction. Our great investigators have given us sufficient work for a time; but if their spirit die out, we shall find ourselves eventually in the condition of those Chinese mentioned by De Tocqueville, who having forgotten the scientific origin of what they did, were at length compelled to copy without variation the inventions of an ancestry who, wiser than themselves, had drawn their inspiration direct from Nature.

To keep society as regards science in healthy play, three classes of workers are necessary: Firstly, the investigator of natural truth, whose vocation it is to pursue that truth, and extend the field of discovery for the truth's own sake, and without any reference to practical ends. Secondly, the teacher of natural truth, whose vocation it is to give public diffusion to the knowledge already won by the discoverer. Thirdly, the applier of natural truth, whose vocation it is to make scientific knowledge available for the needs, comforts and luxuries of life. These three classes ought to coexist, and interact upon each other. Now, the popular notion of science, both in this country and in England, often relates, not to science strictly so called, but to the applications of science. Such applications, especially on this continent, are so astounding—they spread themselves so largely and umbrageously before the public eye—as to shut out from view those workers who are engaged in the profounder business of discovery.”

After quoting De Tocqueville on the supposed unfavorable influence which republicanism has on the advance of science, Prof. Tyndall says:—

"It rests with you to prove whether these things are necessarily so, whether the highest scientific genius cannot find in the midst of you a tranquil home. I should be loth to gainsay so keen an observer and so profound a critical writer, but since my arrival in this country, I have been unable to see anything in the constitution of society to prevent any student with the root of the matter in him from bestowing the most steadfast devotion to pure science. If great scientific results are not achieved in America, it is not to the small agitations of society that I should be disposed to ascribe the defect, but to the fact that men among you who possess the genius for scientific inquiry are laden with duties of administration or tuition so heavy as to be utterly incompatible with the continuous or tranquil meditation which original investigation demands. I do not think this state of things likely to last. I have seen in America willingness on the part of individuals to devote their fortunes in the matter of education to the service of the commonwealth, for which I cannot find a parallel elsewhere.

This willingness of private men to devote fortunes to public purposes requires but wise direction to enable you to render null and void the prediction of De Tocqueville. Your most difficult problem will be not to build institutions, but to make men; not to form the body, but to find the spiritual embers which shall kindle within that body a living soul. You have scientific genius among you; not sown broadcast, believe me, but still scattered here and there. Take all unnecessary impediments out of its way. You have asked me to give these lectures, and I cannot turn them to better account than by asking you in turn to remember that the lecturer is usually the distributor of intellectual wealth amassed by better men. It is not as lecturers, but as discoverers, that you ought to employ your highest men. Keep your sympathetic eye upon the originator of knowledge. Give him the freedom necessary for his researches, not overloading him either with the duties of tuition or of administration, not demanding from him so called practical results — above all things, avoiding that question which ignorance so often addresses to genius: What is the use of your work? Let him make truth his object, however impracticable for the time being, that truth may appear. If you cast your bread thus upon the waters, then be assured it will return to you, though it may be after many days."

, Again he enforces this idea in a practical way in his dinner speech:—

"To no other country is the cultivation of science in its highest forms of more importance than to yours. In no other country would it exert a more benign and elevating influence. What, then, is to be done toward so desirable a consummation? Here I think you must take counsel of your leading scientific men, and they are

not unlikely to recommend something of this kind. I think, as regards physical science, they are likely to assure you that it is not what I may call the statical element of buildings that you require so much as the dynamical element of brains. Making use as far as possible of existing institutions, let chairs be founded, sufficiently but not luxuriously endowed, which shall have original research for their main object and ambition. With such vital centres among you, all your establishments of education would feel their influence; without such centres even your primary instruction will never flourish as it ought. I would not, as a general rule, wholly sever tuition from investigation, but, as in the institution to which I belong, the one ought to be made subservient to the other. The Royal Institution gives lectures—indeed it lives in part by lectures, though mainly by the contributions of its members, and the bequests of its friends. But the main feature of its existence—a feature never lost sight of by its wise and honorable Board of Managers—is that it is a school of research and discovery. And though a by-law gives them the power to do so, for the twenty years during which I have been there no manager or member of the institution has ever interfered with my researches. It is this wise freedom, accompanied by a never-failing sympathy, extended to the great men who preceded me, that has given to the Royal Institution its imperishable renown.”

Prof. Tyndall also announced in his speech, his intention of devoting the surplus of the money received from his lectures “to the education of young philosophers in Germany.” We learn from Appleton’s “Popular Science Monthly,” that this surplus amounted to \$13,000. This sum has been conveyed, by an article of trust, to the charge of a committee, of which Prof. Joseph Henry is chairman, and which is authorized to expend the interest in aid of students who devote themselves to original researches. This is certainly, the Journal adds, a noble example, and deserves to be emulated.

THE eminent French naturalist Pouchet died Dec. 6, 1872, aged 73. He was the original advocate of the theory of spontaneous generation in its modern form.

WE have been obliged to defer several reviews and miscellaneous articles until the next number, and beg the indulgence of our correspondents whose articles have been unavoidably crowded out for two or three months past.

WE have also an important list of “Books Received,” which we shall give in the next number.